

[REAL-TIME VELOCITY AND PORE-PRESSURE PREDICTION AHEAD OF DRILL BIT]

Abstract

Techniques for estimating velocity ahead of a drill bit include generating seismic waves at a surface from at least two different source positions in the vicinity of a borehole, receiving seismic waves reflected from a reflector ahead of the drill bit at one or more locations in the borehole, determining travel times of the seismic waves received at the one or more locations in the borehole, and inverting the travel times to determine a velocity of a formation ahead of the drill bit. One embodiment includes transforming the velocity into pore pressure of the formation.